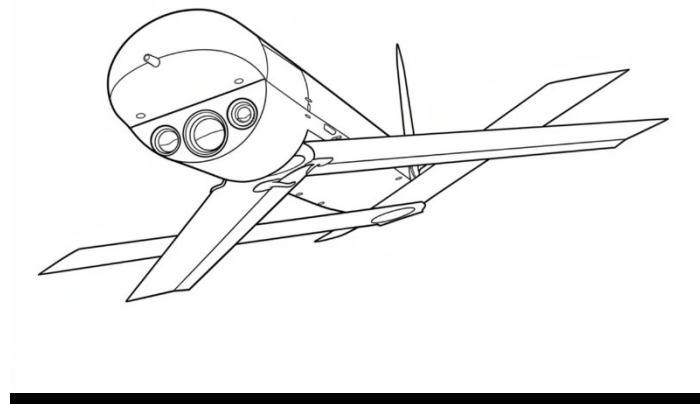


AeroVironment Blackwing



IDENTITY & DESIGNATION

Official Designation: Blackwing (UAS-S designation); no public DoD designator confirmed

Manufacturer: AeroVironment, Inc. (Simi Valley, California, USA)

Country of Origin: United States

Year Introduced: Development began ~2012; operational deployment ~2016-2018 (exact dates not publicly confirmed)

Classification Note: Many operational details remain classified; data card constructed from public sources and AeroVironment press materials

CLASSIFICATION

Domain: Air (submarine-launched); Multi-Domain capable

Category: Military / Special Operations / Submarine-Launched

Sub-Category: Tube-launched Fixed-Wing Nano/Micro ISR UAS

Terminal Mode: Expendable (no recovery mechanism); deep stall or controlled descent at end of mission

Expendable: Yes

Size Class: Nano/Micro

PHYSICAL SPECIFICATIONS

Launch Canister: Fits standard submarine signal ejector (3-inch diameter)

Configuration: Folding-wing fixed-wing aircraft; wings deploy on water surface after ejection

Weight: [VERIFIED --- exact weight classified; estimated sub-2 kg based on canister constraints]

Wingspan: [VERIFIED--- folded to fit 3-inch canister; deployed wingspan estimated 0.5-1.0m]

Waterproofing: Full waterproof encapsulation for submarine ejection and surface water exposure

Domain Transition: Ejected underwater → rises to surface → canister releases → wings deploy → electric motor starts → transitions to powered flight

PROPULSION & PERFORMANCE

Propulsion Type: Electric pusher propeller (battery powered)

Max Flight Time: Approximately 60 minutes [VERIFY]

Range: Approximately 10-15 km from launch point [VERIFY]

Operational Ceiling: Low altitude ISR profile (estimated 100-500m AGL)

Launch Platform: Los Angeles-class and Virginia-class submarine signal ejectors; surface ship launchers

GUIDANCE, NAVIGATION & CONTROL

Control Link: Encrypted data link (details classified)

Navigation: GPS/INS after surface emergence; autonomous flight profile

Autonomy Level: High — must operate with significant autonomy given communication constraints from submarine host

Submarine Integration: Submarine does not surface during launch; crew operates via submarine's communication systems

Fiber-Optic Option: No

SENSORS & PAYLOADS

Primary Sensor: EO/IR camera (details classified)

Data Relay: Real-time video relay to submarine and/or remote operators

Intelligence Return: Video data transmitted in real-time; no physical recovery of aircraft

COST & PROCUREMENT

Unit Cost: [CLASSIFY/VERIFY --- not publicly disclosed; expendable nature suggests sub-\$50,000 per unit target]

Operators: US Navy (primary); likely US SOF (SEAL delivery operations)

Program: Developed under ONR (Office of Naval Research) submarine UAS programs

COUNTERMEASURE VULNERABILITY PROFILE

RF Jamming: MODERATE — encrypted link; brief operational window

GPS Spoofing: MODERATE — GPS-dependent navigation; autonomous modes may provide partial GPS-denied capability

Detection: LOW — nano/micro airframe with electric propulsion; submarine-launch means no detectable pre-launch signature

Primary Countermeasure: Detection is the primary challenge — platform's main defense is surprise and small size. Once detected, conventional C-UAS applies

Overall Vulnerability Rating: LOW (detection phase) --- HIGH (if detected, given expendable airframe)

CRUISE MISSILE CONVERGENCE NOTES

The Blackwing is the most direct expression of the convergence between submarine-launched cruise missiles and drone ISR platforms. The UGM-109 Tomahawk is ejected from the same submarine signal ejectors, transitions from underwater to air, and navigates autonomously to its target. The Blackwing follows an identical physical

trajectory but replaces the warhead with an ISR sensor and the terminal guidance with a camera. The launch platform, the ejection mechanism, the domain transition physics, and the autonomous navigation architecture are shared between the weapon and the reconnaissance platform.

This is not an analogy — it is engineering convergence in the most literal sense. The submarine crew that loads a Tomahawk and the crew that loads a Blackwing use the same signal ejector, the same ejection procedure, and the same launch authorization process. What changes is the payload. The Blackwing makes the convergence thesis physically concrete in a way no other platform in this volume does.

NOTE: *This platform deserves special emphasis in the book precisely because it closes the argument. When I was working on the Tomahawk program, the concept of the missile's ejection tube also launching reconnaissance drones was science fiction. It is now operational. The same tube. The same water-to-air transition. The sensor instead of the warhead. If that doesn't illustrate what this book is about, nothing does.*

OPERATIONAL HISTORY

Operational details classified. AeroVironment has publicly confirmed submarine integration testing and deployment capability. Platform is assessed to be operational with US Navy attack submarines as of approximately 2018. Specific operational deployments not publicly acknowledged. The concept has been demonstrated publicly at industry events with Virginia-class submarine integration confirmed by Navy statements.

SOURCES & CROSS-REFERENCES

Manufacturer: <https://www.avinc.com/uas/view/blackwing>

ONR Program: Office of Naval Research Innovative Naval Prototype programs (submarine UAS)

Cross-Ref: See also: CRACUNS (pre-positioned seafloor variant of similar concept); AeroVironment Puma (surface-launched larger sibling); BGM-109 Tomahawk (same launch platform, strike mission); Switchblade 600 (AeroVironment strike UAS for comparison)